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Dielectronic Recombination of Si-Like Ions and the Low-temperature S^{2+} Orion Nebula Abundance Conundrum JAGJIT KAUR, THOMAS GORCZYCA, Western Michigan University, NIGEL BADNELL, University of Strathclyde — We describe detailed calculations for the dielectronic recombination (DR) of the Si-like isoelectronic sequence. Our theoretical methodology begins with the perturbative, multi-configurational Breit-Pauli code AUTOSTRUCTURE for efficient yet comprehensive calculations along the entire sequence. We have also investigated, using more sophisticated R-matrix and multi-configuration Hartree-Fock (MCHF) approaches, the low-energy DR resonances. The resultant DR rate coefficients at lower temperatures are extremely sensitive to the theoretically-predicted near-threshold resonance energy positions. This problem is especially acute for near-neutral Si-like ions, including the uncertainties in the S^{2+} DR rate coefficient, an important parameter in astrophysical plasma models for the sulfur ionization balance in the Orion nebula. The computed DR rate coefficients comprise part of the assembly of the DR data base required in the modeling of dynamic finite density plasmas.

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